
Maxwell Irrigation District's Water Use Efficiency Grant Application

- A-1** Agricultural Project, individual application
- A-2** Maxwell Irrigation District Conjunctive Use Project to Partially Address CALFED Quantifiable Objectives 20 and 30 (Flow in the Sacramento River) and 27 (Flexible Water Supply for Wetlands) and CALFED Priority Outcome 24 (Reduced in Salinity in the Colusa Basin)
- A-3 - A-8** **Maxwell Irrigation District**
P.O. Box 217
Maxwell, CA 95955
Telephone: (530) 438-2773
Fax: (530) 438-2114
E-mail: maxwellirrigation@colusanet.com
Project contact person: Douglas McGeoghegan
- A-9** The total funds being requested for this project is \$545,000
- A-10** The applicant's staff will provide in-kind services estimated at \$95,000
- A-11** Duration of project:
- A-12** California Assembly Representative: Dick Dickerson, District No. 2
California Senator Representative: Maurice Johannessen, District No. 4
Congressional District: Doug Ose, District No. 3
- A-13** Maxwell Irrigation District (District) represents a total of approximately 6,800 acres located approximately 10 miles north of the city of Williams and approximately 15 miles south of the city of Willows. A small portion of the District, approximately 590 acres, is located east of the Colusa Drain near the northern boundary of the Delevan National Wildlife Refuge and south of the main east/west canal leading from the Sacramento River to the Colusa Drain. The major portion of the District is bounded on the east by the Colusa Drain, and on the west, north, and south by the Glenn-Colusa Irrigation District. A portion of the District's northern boundary is shared with the Delevan National Wildlife Refuge. This area represents a portion of the CALFED Quantifiable Objective Sub-Region 3 and 4.
- A-14** Name and signature of official representing applicant. By signing below, the applicant declares the following:
- S the truthfulness of all representations in the proposal;
 - S the individual signing the form is authorized to submit the application on behalf of the applicant;
 - S the applicant will comply with the contract terms and conditions identified in Section 11 of this PSP.

Douglas McGeoghegan
Authorized Representative: (Printed)

Date

Douglas McGeoghegan (Signature)

B-1 Description of the Project

This application is for funding to develop a reliable supplemental source that will meet the water supply and reliability needs of the agricultural lands and wetlands within the Maxwell Irrigation District (District). The District is proposing to develop a conjunctive use project which will include the development of up to three deep wells (approximately 700-750 feet in depth) located in close proximity to the District's existing conveyance canals. Initially, the wells will be used primarily as a supplemental or back up supply to the District's existing surface water supplies from the Sacramento River and its tributaries. The project will assure the availability of a reliable supply of good quality water for the District's 6,100 acres of permanent and agriculturally induced wetlands. In addition, having available groundwater wells will provide the opportunity to supply water to additional lands within the Colusa sub-basin, such as the Delevan National Wildlife Refuge, during times of critical need. The expandability of the project's benefits beyond the Colusa sub-basin are a subject of the future phase.

The District is located approximately 10 miles north of the city of Williams and approximately 15 miles south of the city of Willows. A small portion of the District, approximately 590 acres, is located east of the Colusa Drain near the northern boundary of the Delevan National Wildlife Refuge and south of the main east/west canal leading from the Sacramento River to the Colusa Drain. The major portion of the District is bounded on the east by the Colusa Drain, and on the west, north, and south by the Glenn-Colusa Irrigation District. A portion of the District's northern boundary is shared with the Delevan National Wildlife Refuge. Sharing property boundaries with the National Wildlife Refuge has both its historical attributes, which will be discussed further below, and provides the District opportunities to assist in providing environmental benefits. For instance, within the District, there are approximately 4,600 acres planted to rice each year and 1,500 acres of permanent wetlands. This represents almost 90% of the entire District, which provides obvious and direct environmental benefit to the waterfowl migration in the Pacific Flyway as well as benefiting many species of shore birds.

The District has a state-of-the-art fish screened pump diversion facility (constructed in 1994) on the right bank of the Sacramento River. Water is diverted from the river into the District's main canal, which travels approximately four miles to the first delivery point which serves approximately 590 acres on the east side of the Colusa Drain. Historically, the main canal delivered water into the Colusa Drain upstream of a dam structure that provided the control to deliver water into the District's main canal traveling southerly on the west side of the Colusa Drain through the Delevan National Wildlife Refuge to the main part of the District service area. In 1999 the District completed installation of a siphon facility and now has the capability to siphon its Sacramento River water under the Colusa Drain and deliver it into the main canal that travels through the Delevan National Wildlife Refuge. From the head of the canal, leading from the structure on the Colusa Drain, water travels southerly through the Delevan National Wildlife Refuge approximately 5 miles to the District's main pumping plant located on the south side of Maxwell Road. At this location the flows of the main canal are combined with the flows of Stone Corral Creek. The main pumping plant is near the eastern boundary of the service area. At this location there are six pumps with one pump delivering water to the east to approximately 180 acres. The remaining five pumps deliver water to a canal that parallels Maxwell Road to the west to supply the remainder of the service area. All water that is either not pumped at the District's main pumping plant or tail water from irrigation within the District flows and discharges into the Colusa Drain, and is part of the water supply for downstream users.

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Map of District

Map is included in hard copies of Application.

(Insufficient disc space available to provide electronic version)

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The majority of the District overlies what is known as the Stony Creek Aquifer. This aquifer holds an unknown but expected to be large quantity of water, and has excellent recharge characteristics. The District has recently undertaken reconnaissance-level investigations to understand and evaluate its ability to make use of the Stony Creek Aquifer. These reconnaissance-level investigations help support the previous understanding relative to the Stony Creek Aquifer characteristics.

The District has an agreement with the landowner to develop up to two wells to be located along the District's main east/west canal leading from the Sacramento River to the Colusa Drain (Tuttle Sites). The actual location of the well or wells has yet to be determined.

Two additional sites have been identified along the northern boundary of the District's main service area adjacent to the Maxwell Road (Gunnarsfield Sites). These sites are adjacent to the District's main delivery canal. Test wells were drilled and logged at these two sites in 1993. A study of these sites was conducted by Luhdorff & Scalmanini Consulting Engineers. The results of the study are contained in a March 1995 report prepared for the District and indicate there is an adequate, reliable water supply available to the District from the aquifer. Use of these sites will be dependent upon their acquisition from the landowner.

The District is in an ideal location to take advantage of available groundwater supplies to enhance conjunctive use and provide water for environmental benefits. Benefits could come as reduced diversions from the Sacramento River (Quantifiable Objectives 20 and 30), reliable supplies for wetlands within the District or increased supplies to the Delevan National Wildlife Refuge (Quantifiable Objective No. 27) and improved water quality in the Colusa Drain (Priority Outcome 24). This project will provide the opportunity to realize these benefits.

B-2 Local, Regional, Bay-Delta, State and Federal Water Issues

Local

The District's water rights have been included by the State Water Resources Control Board among the water rights to be considered during Phase 8 of the Bay-Delta hearings. The purpose of these hearings is to consider allocating responsibility to all post-1914 water right holders to meet the 1995 Water Quality Control Plan. This plan requires significantly larger quantities of Delta outflow and improved quality within the Delta for environmental purposes. The potential outcome of the Bay-Delta hearings is uncertain, at best. The hearings could result in a greater level of responsibility being placed on the upstream water right holders, including the District. However, as identified in Section D-3, Partnerships, the District is party to the Settlement Agreement addressing the SWRCB's Phase 8 hearing.

This project will provide a reliable supply of good quality water to meet both the agricultural and wetland needs within the District, especially in times of shortages. In addition, the conjunctive use of water developed under this project provides more reliable supplies for water users who rely on the water supply available in the Colusa Drain. This also could result in improved water quality in the Colusa Drain. The project also could be expanded to provide water to the Delevan National Wildlife Refuge, other water users or the Environmental Water Account while maintaining the supply to meet the District's needs.

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The project area is located in Colusa County between the town of Maxwell on the west and the Sacramento River on the east. As identified in a Biological Survey Report prepared for the District in 1997 (1997 Report) the topography of the project area is typical of the Great Central Valley of California, consisting primarily of flat and slightly undulating terrain from zero to 2 percent slope. The 1997 Report identifies numerous plant and animal species which are found within the project area. These species are dependant on a wetland habitat such as is found within the District's service area. This project will assure a reliable supply of good quality water is available to support this diverse wetland community (CALFED Quantifiable Objective 27 and Priority Outcome 24). The wells developed by this project will be used, as needed, to assure a continuous supply to the District's 6,100 acres of permanent and agriculturally induced wetlands.

Regional

Several of the larger Sacramento River Settlement Contractors have been working cooperatively with the U. S. Bureau of Reclamation and the California Department of Water Resources since 1997 in the development of the Sacramento River Basin-wide Management Plan (BWMP). The District has been an active participant in that process. Among the recommendations identified in the BWMP is to manage water among districts and ultimately other entities at a hydrologic sub-basin level. Management at this level would help optimize the efficient use of surface water and groundwater supplies and achieve the appropriate level of drain and return flow water use between water users located within a given sub-basin. This project provides the opportunity to help meet the increasing water supply (Quantifiable Objectives 20 and 30) and water quality (Priority Outcome 24) demands of the District, the Colusa Drain, Delevan National Wildlife Refuge, the Sacramento River and the Bay-Delta Estuary.

Bay-Delta

This project will help meet CALFED Quantifiable Objectives 20 and 30 by providing opportunities to improve instream flow and timing in the Sacramento River. In times of shortages in the Delta, the District could rely on the ground water supply developed under this project and forgo some of its surface water supply. This unused surface water supply could then be made available to help meet minimum flow requirements in the Sacramento River, Delta outflow and water quality requirements as well as other Delta demands.

Water Quality Improvement

This project will provide a supplemental supply of good quality water which can be used to maintain and improve water quality within the District as well as the Colusa Drain (Priority Outcome 24). This alone provides benefits to over 50,000 acres. In addition, this water supply may be used, if necessary, to improve water quality conditions within the Delevan National Wildlife Refuge. Water not diverted by the District from the Sacramento River could be made available to meet water quality requirements downstream of the District's point of a diversion and in the Delta.

B-3 Nature, Scope and Objectives

The District has identified four prospective well sites and plans to develop wells at up to three of these sites under the proposed project. Each well will be drilled to a depth of approximately 750 to 800 feet. Completion of each well will include installation of 20 and 16-inch blank and 16-inch perforated casing. The perforated casing will include wire wrapped screening. Each well will be grouted and sealed to prevent infiltration and contamination from surface water. The wells will be equipped with 125 HP pumps. The wells will be designed for pumping capacities

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of approximately 4,000 gallons per minute (gpm) each. Each well will be located adjacent to, or in close proximity of, the District's existing conveyance canals. Short lengths (less than 100 feet) of 16 inch smooth wall pipe will be used, as needed, to convey water from the wells to the existing canals. The water can then flow by gravity into the balance of the District's distribution system. Based on available information, the cost to pump water at a rate of 4,000 gpm is estimated to be approximately \$27.50 per acre-foot.

The objectives of this project are to allow the District to more efficiently and effectively use its water supplies as stated above. The Project would also partially satisfy some of CAFED's Quantifiable Objectives. We believe the following quantifiable objectives would be improved by this project.

This project will assure a reliable supply of good quality water is available to support this diverse wetland community. Initially this supplemental supply will be used as a supplemental or backup supply for the District's surface water supplies. Therefore the wells will be used, as needed, to assure a continuous supply to the District's 6,100 acres of permanent and agriculturally induced wetlands. In addition this project provides the opportunity to help meet the increasing water supply and water quality demands of the District, the Colusa Drain, Delevan National Wildlife Refuge, the Sacramento River and the Bay-Delta Estuary. This project will provide a flexible and reliable water supply for the flood irrigation of thousands of acres of rice, with the attendant wildlife habitat benefits. Further, the contribution of avoided surface water diversion from the river and Delta system, particularly in dry years, will enhance fish and wildlife habitat (Quantifiable Objectives 20 and 30).

Added Delta Supply

The proposed project will allow the District to contribute increased surface flow in the Sacramento River and the Delta. The direct benefit to the Delta may be a 1:1 increase in surface flow to the Delta for the full amount of pumped groundwater during dry years. In wet/normal years, there is some possibility that, some regular use of groundwater could make available an increase surface water which could be transported to the Delta or held in storage upstream for subsequent addition to releases/stream flow in dry years (CALFED Quantifiable Objectives 20 and 30).

B-4 Methods, Procedures and Facilities

As identified in the 1998 Negative Declaration and Initial Study prepared for the District's winter season diversions, the easterly portion of Colusa County, in which the District is located, is part of the Sacramento Basin, an extensive ground water body. The principal sources of recharge to the groundwater basin are geologic formations known as the Plo-Pleistocene Tehama Formation and the overlying Quaternary alluvium. The alluvium consists of recent alluvium to a depth of 100 feet, underlain by Pleistocene channel deposits to a depth of 200 feet. Groundwater in this area is generally unconfined, which means it is free-flowing. The recent alluvium is saturated most of the year, because it absorbs water from rainfall and the overflow of small creeks. Areas of older alluvium and the Cretaceous rocks of the foothills do not bear significant quantities of water.

Availability and Reliability

Groundwater generally flows from the north in a south east direction north of Maxwell. South of Maxwell, the direction of groundwater flow is more easterly. In the winter, groundwater recharge occurs primarily by deep

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percolation of precipitation and stream flow. Applied irrigation water is also a source of recharge. The District holds Licenses 7210, 5692, 4734, 4694, 4644, 4643, and 4586 (Applications 8631, 13919, 13735, 11958, 11957, 11955 11956 and 14378) for diversions during the irrigation season. The District also holds a Water Right Settlement Contract with the U.S. Bureau of Reclamation which provides a firm supply of irrigation water during the summer months. In addition the District holds Permit 21004 (Application 30445) for winter season diversions. The District's winter water right permit allows for water to be diverted in the non-irrigation season for rice straw decomposition and waterfowl habitat. As discussed below, historical observations of groundwater conditions even during periods of relatively high pumping, clearly show an aquifer system that benefits from in-lieu recharge.

Quality

The sources of recharge identified above are of excellent quality for the purposes of irrigation and wetland water supply. Based on historical observations from wells in the surrounding area the groundwater which will be pumped from these wells is also of excellent quality for the intended uses.

Hydrogeologic Suitability

Varying amounts of groundwater were pumped for different purposes in the Maxwell area, mostly within in the boundaries of the surrounding Glenn-Colusa Irrigation District (GCID) during the years 1992, 94, 95, 96, and 97. Throughout this time period, notably including the 1992 and 1994 dry years when totals of 77,776 AF and 52,152 AF respectively were pumped, groundwater levels showed ongoing stable conditions. That is, minor seasonal fluctuations but essentially no increasing or decreasing trend over time. Although the majority of this intermittent groundwater pumping occurred more to the north in GCID, some pumping at very high capacities also occurred in the Maxwell area. A review of the historical records indicates the pumping in this area has not caused a change in groundwater levels or quality. Thus, even without purposeful artificial recharge, there is widespread historical evidence that in-lieu recharge particularly during periods of low to no pumping, has maintained an essentially constant or "full" groundwater basin. From these historical observations, it would appear that the District's proposed conjunctive use program of pumping and in-lieu recharge is both technically feasible and unlikely to result in any substantial change in groundwater conditions over those which have been experienced historically.

Expandability

This project could be expanded to provide water for the Delevan National Wildlife Refuge, for improving water quality in the Colusa Drain, the Sacramento River and the Delta, for alternative or supplemental water supplies to other water users in the Sacramento Valley, to increase Delta supplies.

By expanding this project water could be made directly available for use within the Delevan National Wildlife Refuge which is located adjacent to the District and it's conveyance facility. Delevan National Wildlife Refuge consists of a diverse wetland community of plants and animals. This wetland community is dependant on a continuous supply of good quality water.

Water could be made available under this project to maintain or improve water quality in the Colusa Drain. The District has been involved in transfers to the Colusa Drain Mutual Water Company during the past five years. The purpose of these transfers has been to supply water not needed by the District to the Colusa Drain to improve water quality within the drain which has declined in recent years as a result of Endangered Species Act actions and increased conservation efforts by upstream water users.

Added Delta Supply

In times of shortages the District could rely on the ground water supply developed under this project and forgo some of its surface water supply. This unused surface water supply could then be made available to meet Delta outflow and water quality requirements as well as other Delta demands (Quantifiable Objective 20 and 30).

Water Quality Improvement

The project could be expanded to provide a supplemental supply of good quality water directly to the Colusa Drain to maintain and improve water quality (Priority Outcome 24). In addition, this water could be supplied to improve water quality conditions within the Delevan National Wildlife Refuge. In addition water not diverted by the District from the Sacramento River could be made available to meet water quality requirements downstream of the District's point of diversion and in the Delta.

B-5 Schedule

Upon approval of the project and subsequent funding agreements the District will begin the preparation of the required environmental documentation for the project. This process is expected to take up to two months to complete. Once the environmental documentation is completed, the District will drill two test holes for evaluation of the Tuttle well sites. The District will review the data from these test wells to determine which three of the four potential well sites will provide the greatest benefit for the project. Coincident with the drilling of the test wells, the District will begin negotiations regarding the acquisition of the Gunnersfield site or sites. It is estimated that the selection of the well sites will be completed within one month of the completion of the environmental documentation.

After the three well sites have been selected, contracts will be let for the required site improvements, drilling and completion of the wells and conveyances, and PG&E will be contacted for the installation of the necessary equipment for the power supply at each site. It is estimated the wells will be constructed and all necessary tests will be completed within six months after the funding agreements have been signed.

While the wells are being completed, the District will develop a program for recording monitoring and reporting use under its conjunctive use project. The District plans to develop the monitoring and reporting program in conjunction with the Colusa High School Environmental Science Academy (Academy). The District will provide technical assistance, training and funding to the Academy to assure the continuation of a quality program. The intent of involving the Academy is to provide the participants with a valuable hands-on educational program relating to environmental issues both locally and statewide.

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Maxwell Irrigation District Project Proposed Time Line									
Task		Month							
		1	2	3	4	5	6	7	8
Prepare Environmental Documentation	Funding Agreements Signed	■	■						
Drill Tuttle Test Holes				■					
Evaluate and Select Test Holes				■	■				
Site Improvements					■	■	■		
Drilling and Completion of Wells						■	■	■	■
Installation of Minor Conveyances									■
Conduct Necessary tests on Completed Wells								■	■
Negotiate Acquisition of Gunnersfield Sites				■	■	■			
Develop Monitoring and Reporting Program				■	■	■			
Prepare and Submit Project Progress Reports					■			■	■

B-6 Monitoring and Assessment

Construction Phase

The District will monitor and provide reports to the appropriate agencies regarding progress during the construction phase of the project. As identified in Section B-5, above, the District anticipates the construction phase of this project will be completed within six months of the signing of the funding agreements for the grant. A minimum of two progress reports will be prepared during the construction phase.

Operation Phase

Once construction is complete, the District will implement a program to collect, evaluate and report data regarding water use, water quality and impacts of the project. The District intends to develop its monitoring program in conjunction with its groundwater management plan. The District plans to include the Colusa High School Environmental Science Academy (Academy) as an integral component of the program. The District will provide technical assistance, training and funding to the Academy to assure the continuation of a quality program. The intent of involving the Academy is to provide the participants with a valuable hands-on educational program relating to both local and statewide conservation and environmental issues.

The monitoring and reporting program will include the following:

- Collecting static water level data each spring and fall.
- Collecting Electrical Conductivity (EC) and temperature data from each well monthly.
- Collecting EC and temperature data in the canal upstream and downstream of each well monthly when the

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wells are in use.

- Sampling of other potential contaminants at least once each year when the wells are in use
- Annual reconnaissance surveys to identify and evaluate any potential impacts, either positive or negative, resulting from the project. Should negative impacts be discovered, the District will take steps to evaluate the extent of the impacts and determine how best to remedy or mitigate for them.
- Preparation of quarterly reports summarizing data collected and comparing with previous data. In addition to the data collected the reports may include maps, photographs, charts or other reasonable means to clearly depict the data.

Future Phase

Upon completion of construction and some level of the operation phase of the project, a future phase of the project will be to proceed with the furtherance of the Bay-Delta Phase 8 Settlement Agreement. This will include discussions on how the benefits from this project can be expanded outside of the District and the Colusa sub-basin while maintaining assurances for the District and the local area, including environmental needs. The discussions will include all parties to the Phase 8 Settlement Agreement including the U.S Bureau of Reclamation, the Department of Water Resources and export interests. A likely outcome of these discussions could be a demonstration project to gain knowledge relative to the groundwater aquifer, surface water interaction, and the potential impacts. This future phase is essential to provide the opportunity to expand the project while maintaining assurances for the local area.

C-1 Project Outreach

The District is pursuing this conjunctive use program at the direction of its constituents. The District will publish/post notices as required to assure neighboring landowners are informed of the proposed project. The District informed the Colusa County Board of Supervisors and the Planning Department of its intention to develop this project. The District will accept and respond appropriately to any comments received regarding this project. The District has informed the Colusa County Board of Supervisors and the Planning Department of its intention to develop this project.

C-2 Training, Employment and Capacity Building

The project itself does not directly involve training, employment or building capacity. However as stated above, the District plans to develop the monitoring and reporting program in conjunction with the Colusa High School Environmental Science Academy (Academy). The District will provide technical assistance, training and funding to the Academy to assure the continuation of a quality program. The intent of involving the Academy is to provide the participants with a valuable hands-on educational program relating to environmental issues both locally and statewide. In addition, the project supports the ultimate goal of both CALFED and the BWMP to manage agricultural water supplies more efficiently. The project will help provide a more reliable, flexible, and better managed water supply which will help sustain local, as well as statewide economy by accommodating growth in industry and agriculture, including growth in employment opportunities in all economic sectors.

C-3 Dissemination of Information

As identified in Section B-5, the District will prepare periodic reports of the progress of this project. These progress reports will be provided to the appropriate entities and agencies, such as CALFED, the U.S. Bureau of Reclamation, the U.S. Fish and Wildlife Service (Delevan National Wildlife Refuge), the Colusa County Board of Supervisors, the Colusa County Planning Department, and adjacent water districts. These reports will also be made available upon request. As identified above, once the construction phase of the project is completed the District will develop a conjunctive use plan. The plan will include the preparation of annual reports on the District water use. These reports will also be provided to the appropriate entities and agencies, These reports will also be available upon request.

C-4 Provide Copy of Letter to Local Land use entity, Water district or other potentially impacted or cooperating agency notifying them of the proposal

See Attachments

D-1 Qualifications of Applicants

Attached are the resumes of Joe Scalmanini, Scott Heule, Marc Van Camp, Thomas Hickmann and Gary Kienlen. Joe Scalmanini would be the project manager conducting the data gathering and preliminary analysis. Marc Van Camp and Gary Kienlen would assist in reviewing the data, provide assistance on report writing and data gathering.

D-2 Role of External Cooperators

As proposed, it is not anticipated the project will require additional assistance from any other entity or agency.

D-3 Partnerships

The District has participated in the extensive discussions which have led to the draft Sacramento Valley Settlement Agreement currently being considered by the SWRCB in Phase 8 of the Bay-Delta hearings. This Settlement Agreement forms a partnership between Sacramento Valley water right holders, including the District, water users within the export areas, DWR, and Reclamation that has never been achieved to this magnitude in history. The Settlement Agreement recognizes the need to increase the overall water supplies available to all water users throughout the state and that a cooperative approach is the most effective means to meet this need. The Settlement Agreement and associated projects must be pursued in unison with CALFED goals, objectives and program. The project proposed by the District for funding under this grant application is a project that meets the common goals of the Settlement Agreement and CALFED.

E-1 – E-2 Proposed Itemized Budget and Budget Justification

See attached table

E-3 Quantifiable Outcomes

Based on the preliminary studies completed by the District to date, the groundwater wells are expected to yield 4,000 gallons per minute (17.7 AF/day) each. Assuming the wells could be used over the entire irrigation season of approximately 120 days the wells would produce a total of 6,372 acre-feet. This represents the maximum potential quantity to help meet CALFED's objectives of reduced diversions from the Sacramento River (Quantifiable Objectives 20 and 30), reliable supplies for wetlands within the District or increased supplies to the Delevan National Wildlife Refuge (Quantifiable Objective No. 27) and improved water quality in the Colusa Drain (Priority Outcome 24). In addition, to this quantity of water, the project provides an unquantifiable benefit in the form of reliability and flexibility as well as the ability to change water supply sources to meet CALFED and Phase 8 Settlement Agreement objectives. These objectives can not be realized or furthered without a commitment to fund this project.

The water quality benefit can only be qualitatively stated at this time. The groundwater which will be pumped is of excellent quality for the intended uses and will provide opportunities to improve water quality within the Colusa sub-basin especially in dry and critical years.

GK/gk

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ATTACHMENTS

MAXWELL IRRIGATION DISTRICT

A Public Entity

P.O. Box 217, 35 Oak Street, Maxwell, California 95955 • Phone 530.438.2773 Fax 530.438.2114

February 15, 2001

Colusa County Planning & Building
220 12th Street
Colusa, CA 95932

Ladies and Gentlemen:

Maxwell Irrigation District is currently seeking financial assistance for the purpose of identifying and developing a groundwater supply within the district. The district is applying for this assistance through CALFED's Water Use Efficiency Program.

The purpose of this letter is to inform you of the district's activities and to solicit your support of the project.

Should you have any questions or comments, please do not hesitate to contact me at the district office at 530/438-2773 or at one of the following numbers:

Office	530/438-2488
Mobile	530/701-8845
Pager	530/770-6851

Thank you for your attention to this matter.

Sincerely,

Douglas B. McGeoghegan
Chairman of the Board

GK/mv

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MAXWELL IRRIGATION DISTRICT

A Public Entity

P.O. Box 217, 35 Oak Street, Maxwell, California 95955 • Phone 530.438.2773 Fax 530.438.2114

February 15, 2001

Colusa County Board of Supervisors
546 Jay Street
Colusa, CA 95932

Ladies and Gentlemen:

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Mobile	530/701-8845
Pager	530/770-6851

Thank you for your attention to this matter.

Sincerely,

Douglas B. McGeoghegan
Chairman of the Board

RESUME

Joseph C. Scalmanini

Specialization:

Thirty-three years of experience in ground_water development and management, and oil and gas production. Assessments of ground_water resources and implementation of ground-water basin management in various areas of California; ground_water development and management encompassing well design, construction, operation, and maintenance; ground-water monitoring as part of basin management and as part of ground-water contamination investigations; artificial ground_water recharge facilities and practices; injection of industrial waste water; utilization of brackish ground water for industrial water supply and cooling applications. Industrial design, construction and operation of secondary oil recovery systems involving water and steam processing, injection and recovery.

Professional Registration:

Registered Civil Engineer, California, CE 28233

Academic Degrees:

M.E. Civil Engineering, University of California, Davis, CA	1984
B.S. Mechanical Engineering, University of Santa Clara, Santa Clara, CA	1967

Professional Experience:

Luhdorff and Scalmanini, Consulting Engineers, Woodland, CA Partner	1980 to Present
University of California, Davis, Davis, CA Associate Development Engineer	1973 - 1979
Shell Oil Company Mechanical and Facilities Engineer	1967 - 1973

Representative Professional Assignments:

- Consultant to water districts and utilities, municipalities, corporate and individual farming interests, corporate and private industry, and other engineering firms on ground_water development, utilization and management. Consultation with public agencies, corporate and private concerns regarding ground_water contamination, its identification, monitoring, and management. Consultation with legal profession on technical aspects of ground_water development and utilization, including well design and construction and application of pumping equipment.

Representative Professional Assignments (continued):

- Engineering research in ground_water resources, development and management. Coordinated and conducted engineering projects concerning assessment of ground_water resources in various areas of California including mountainous and valley regions; application of principles of design, construction, completion and development of wells, aquifer analyses, design of pumping equipment, optimal and efficient operation of wells and pumps, and well rehabilitation and maintenance; design of artificial ground_water recharge facilities and practices, including surface infiltration and deep_well injection; assessment and development of brackish ground_water for water supply and cooling applications in industrial plants. Provided consultation services to engineering firms; local, state and federal agencies, corporate and private industry and farming interests, and well contractors on the development and management of ground_water resources.
- Project Engineer on water treatment, injection, and recovery systems for secondary oil recovery in Southern California oil fields; project engineer for the design and installation of facilities and utilities in a new oil field development in Central California; design engineer on various pumping and piping applications of water, oil, gas and other compressible fluids.

Professional Affiliations:

American Society of Civil Engineers

- _ Ground Water Committee, Irrigation and Drainage Division
- _ Water Resources Planning Committee, Water Resources Planning and Management Division

National Ground Water Association

- Association of Ground Water Scientists and Engineers

American Water Works Association

National Society of Professional Engineers

California Groundwater Association

Groundwater Resources Association of California

Public Service:

- **Yolo County Aggregate Resources Committee (1975_79)**, Alternate delegate, hydrologist _ analysis of impacts and development of management plans for extraction of aggregate from Cache Creek basin.
- **California Tenth Biennial Conference on Ground Water (1975)**, Member, Planning Committee
- **Chancellor's Campus (Univ. of Calif., Davis) Water Committee (1976_78)**, Staff Engineer _ analysis of water supplies and uses, projection of requirements, development of conservation and management plans.
- **City of Davis Water Planning and Conservation Committee (1977_79)**, Chairman _ analysis of water supplies and uses, projection of requirements, consideration of alternative supplies, development of conservation and management plans.
- **Yolo County Water Resources Task Force (1979)**, Member _ development of county_wide master water plan.

Public Service (continued):

- **Pacific Gas and Electric Co. ACT² Irrigation Pumping Demonstration Project (1992)**, Technical Advisor
- **Association of California Water Agencies (1994-1996)**, Member - Ground-Water Committee
- **Cache Creek Conservancy, (2000-)**, Director

Teaching Activities:

Course Coordinator and Instructor University Extension Courses, University of California, Davis:

Concepts of Ground Water Management (1974, 1976, 1978, 1981)
Legal and Policy Considerations in Ground Water Management (1975, 1976, 1980)
Water Supply Wells and Pumps (1977, 1978, 1981, 1983, 1985, 1986)

Instructor, University of California, Davis, Water Science 198, Introductory Hydraulics (1977, 1978, 1979)

Lecturer, University of California, Davis, Water Science 2, 140, 160; Ecology 230; Civil Engineering / Geology 175.

Lecturer on Aquifer Characteristics, Well Hydraulics, and Ground-Water Development, in Technical Training Classes at the U.S. Army Corps of Engineers' Hydraulic Engineering Center, Davis, CA.

Publications and Presentations:

Scott, V.H. and J.C. Scalmanini, **Water Wells and Pumps: Their Design, Construction, Operation, and Maintenance**, University of California Division of Agricultural Sciences Bulletin No. 1889, 1977.

Helweg, O.J., Scott, V.H., and J.C. Scalmanini, **Improving Well and Pump Efficiency**, American Water Works Association, 1983.

Scalmanini, J.C., and Scott V.H., **Design and Operational Criteria for Artificial Groundwater Recharge Facilities**, Water Science and Engineering Paper No. 2009, University of California, Davis, 1979.

Scalmanini, J.C., Scott, V.H., and O.J. Helweg, **Energy and Efficiency in Wells and Pumps**, presented at Twelfth Biennial Ground Water Conference, 1979.

Scalmanini, J.C., Johnson Jr., R.M., and E.E. Luhdorff Jr., **Development of a Ground-Water**

Monitoring Program as a Basis for Coastal Ground-Water Basin Management, presented at the Fall Conference, American Water Works Association, CA-NV Section, 1983.

Scalmanini, J.C., **3030 Hindsight and 2020 Foresight, Actual Ground-Water Management Experience**

Over the Last 15 Years, Soquel Creek Water District, presented at the Association of California Water Agencies' Ground-Water Management Conference, March 1994.

Publications and Presentations (continued):

Scalmanini, J.C., **Legal and Technical Issues Related to Surface Water and Ground-Water Interaction**, presented at the Groundwater Resources Association's California Ground Water & Efficient Usage for the Year 2000 and Beyond, October 1998.

Scalmanini, J.C., **What the Heck's a Sub-Basin? Defining Basins and Sub-Basins**, presented at the Association of California Water Agencies' Ground-Water Management: Will CalFed Help or Hinder Workshop, November 2000.

RESUME

Scott D. Heule

Specialization:

Twenty-two years of experience investigating ground water resources availability, occurrence, and movement, ground water issues associated with engineering geology, and ground water quality characterization throughout California and Oregon.

Professional Registration:

California, Certified Engineering Geologist, EG 1173
California, Certified Hydrogeologist, HG 143
California, Registered Geologist, RG 3799
Oregon, Engineering Geologist, EG 1515

Academic Degrees:

B.A. Earth Science, California State University, Fullerton, CA 1977

Professional Experience:

Luhdorff & Scalmanini, Consulting Engineers, Woodland, CA Senior Hydrogeologist	April 1999 - Present
EMCON, San Bernardino, CA Senior Hydrogeologist	1996 - 1999
Scott Heule & Associates, Consulting Hydrogeology, Big Bear Lake, CA Principal Hydrogeologist	1989 - 1996
David J. Newton Associates, Inc., Portland, OR Senior Hydrogeologist	1993 - 1994
Ron Barto Ground Water Consultants, Big Bear Lake, CA Managing Hydrogeologist	1989
Leighton and Associates, Inc., Riverside, CA Senior Hydrogeologist	1988 - 1989

Professional Experience: (continued)

Fluor-Daniel Inc., Irvine, CA Project Hydrogeologist	1988
Ron Barto & Associates Consulting Hydrogeologists, Big Bear Lake, CA Supervising Hydrogeologist	1984 - 1988
Leighton and Associates, Inc., San Diego, CA Senior Hydrogeologist, Ground Water Resources Division Manager	1978 - 1984
Robert C. Fox, Fullerton, CA Hydrogeologist	1977 - 1978

Representative Professional Assignments:

- Eagle Crest II, Redmond, Deschutes County, OR. This project required analysis of long term pumping impacts for golf course irrigation well production. The work included estimation of aquifer hydraulic characteristics, preparation of a conceptual model of the exceptionally permeable basalt source aquifer, and comparison to a previous short term pumping test. Also associated with this work was an evaluation of potential for streamflow depletion resulting from the project irrigation demands.
- Hydrogeologic Evaluation for Spring Water Development, Skyforest, San Bernardino County, CA. The Skyforest Mutual Water Company desired to wholesale "spring" water to a local bottler from a series of horizontal wells drilled into the steep, south facing escarpment of the San Bernardino Mountains. The 120-acres occupied by the horizontal wells reaches nearly to the top of the drainage divide along the ridgeline. Three different methods were utilized to estimate the perennial yield from the "springs" including; evaluation of actual long term use and aquifer response in an adjoining subarea, projections based on computer modeling of rainfall, runoff, soil moisture and evapotranspiration, and a USGS method of recoverable water in mountain basins. Results indicated suitable annual extraction rates of up to 30 AF and the EIR for the project is currently being appealed to the Board of Supervisors due to local citizen opposition to the proposed export.
- Ground Water Resources and Management Plan, Stallion Oaks Ranch, Descanso, East San Diego County, CA. A proposed 193 acre RV resort expansion required additional ground water to satisfy additional domestic water demands. Hydrogeologic studies evaluated ground water recharge and storage in a crystalline rock aquifer. Further evaluations involved ground water quality impact analysis of commercial septic system wastewater disposal. Surficial geologic mapping, subsurface mapping to define alluvial storage areas, a 48-hour pumping test with several observation wells were all part of this work.

- Ground Water Resources Evaluation and Management Plan, Steele Canyon Resort and Golf Club, Jamul, San Diego County, CA An existing 665 acre golf and country club uses imported irrigation water to meet demands of a 27-hole golf course and other non-potable uses. Ground water occurs in both alluvial and crystalline bedrock aquifers, and a portion of the imported irrigation supply is proposed to be supplanted by local ground water. Two 30-day pumping tests were conducted, while monitoring several observation wells with pressure transducers and dataloggers. Other analysis included estimates of long term recharge and ground water storage available to the project. Results of the study indicated a possible 120 AF available to partially satisfy the total demand of more than 400 AF annually.
- Shadow Rock Golf Course Resort, Palm Springs, Riverside County, CA. Hydrogeologic analysis was completed on this 1200-acre property adjacent to the San Jacinto Wilderness area, a unique spring fed cienega and other physiographic features important to local Native Americans. The proposed use of onsite irrigation wells, pesticides associated with the golf course and urban runoff pollution were important considerations in the evaluation of potential ground water quality impacts. After preparing water budget summaries for the proposed project and alternatives, a capture zone analysis was completed to evaluate pumping impacts on the cienega and designed pesticide use BMP's to avoid ground water quality impacts. Mass balance type analysis was completed to evaluate nitrate and total dissolved solids impacts and mitigation measures, such as aquifer testing, and water level monitoring were prepared. Other BMP's were prepared to address concerns with construction storm water management.
- Groundwater Resources Development and Management Plan, High Meadow Ranch, Golf Course and Residential Development, San Diego County, CA. Principal issues associated with this 1,200-acre golf course resort in San Diego's back county included availability of groundwater supplies to augment imported irrigation demands and potential impacts to numerous adjacent private domestic water wells. The challenges facing this project were compounded because the site was located in crystalline bedrock terrain with limited groundwater storage, but typically sufficient annual recharge to meet the groundwater supply objective. Four new well sites were selected using remote sensing techniques, and a strategically placed monitoring well was sited between the development and it's neighbors using borehole video logging and geologic structural analysis. After defining the potential impacts to the adjacent landowners, mitigation measures were designed that included artificial recharge in the overlying residuum of three subbasins with excess winter runoff, and design of a less irrigation intensive links type golf course.

Professional Affiliations:

Geological society of American, Hydrogeology Division

Inland Geological society

EDUCATION

- , California State University, Sacramento
BS in Civil Engineering, 1984

PROFESSIONAL LICENSES AND SOCIETIES

- , Registered Civil Engineer in California
- , Registered Civil Engineer in Nevada
- , Registered Civil Engineer in Oregon
- , Certified Water Right Examiner in Oregon
- , Member, American Society of Civil Engineers

EXPERIENCE

- 1990 - Present MBK Engineers, Sacramento, CA
Principal
Same experience as described below with greater emphasis on the management and supervisory role.
- 1984 - 1989 MBK Engineers, Sacramento, CA
Consulting Civil Engineer
Practice in the fields of hydrology, hydraulics, irrigation, drainage, groundwater, water supply, water rights, project feasibility and related problems.
- Major thru-Delta Water Transfers.* Included obtaining regulatory approval, scheduling of releases and delivery, contract negotiation and monitoring of water right changes.
- Licensing of Nevada Irrigation District's appropriative water rights.* Included detailed analysis of water use to license 1920 appropriative water rights for a complicated water supply system. Involved many sessions with State Water Resources Control Board staff to relate water use analysis to water rights held by the District, including its pre-1914 rights.
- Water Supply Contract Negotiations with US Bureau of Reclamation.* Analysis and presentation of potential water right yields to arrive at project/contract quantities.
- Water Right Dispute Settlements.* Gathering of factual data to settle water right issues in lieu of legal proceedings.
- Expert Witness.* Testify as expert witness in water right hearings and court cases.
- 1979 - 1984 US Geological Survey, Sacramento, CA
Engineer Technician

Marc Van Camp

Duties included surveying, hydrologic basic data collection and analysis.

CONTINUING EDUCATION SEMINARS and WORKSHOPS

- , Flood Fight Methods, California Department of Water Resources, 1984.
- , Water Systems Management Workshop, US Bureau of Reclamation, 1988 and 1994.
- , California Water Law, University of California Extension, U.C. Davis, 1989.
- , Irrigation System Evaluation Short Course, DWR and Cal Poly, San Luis Obispo.
- , Flow Measurement, Control and Monitoring Workshop, USBR, DWR and Cal Poly, San Luis Obispo.

EDUCATION

- , American River College, Sacramento, CA
- , AA in Math and Science, 1991

PROFESSIONAL LICENSES and SOCIETIES

- , Registered Civil Engineer in California, C59041
- , Registered Professional Engineer in Oregon, 62730PE
- , Certified Water Right Examiner in Oregon, 62730WRE
- , Associate Member, American Society of Engineers
- , Member, Professional Engineers of Oregon

EXPERIENCE

- 03/99 - Present MBK Engineers, Sacramento, California
Civil Engineer
Same experience as described below with greater independence and discretion.

- 04/88 - 03/99 MBK Engineers, Sacramento, California
Engineering Associate and Water Resources Technician
Practice in the fields of water rights, water supply, irrigation, drainage, hydrology, hydrography, hydraulics, project feasibility and related problems.

Water Rights: Preparation of water right applications and change petitions together with associated maps and related documentation for various project types and sizes. Conduct detailed analysis of water use for the purpose of obtaining water right licenses. Investigation and determination of appropriative, pre-1914 and riparian water rights.

Water Supply: Analysis of water demands for project use, evaporation losses and other factors limiting available water supply. Preparation of reservoir operation studies. Development of procedures for determining capacities, losses and depletions for irrigation districts, watersheds and drainage basins. Design, rating, and supervision of the installation of new, and evaluation of existing, water control structures and measuring devices for both natural and man-made channels. Evaluation of irrigation facilities, including diversion structures, pipelines, and associated works, as well as the review of shop drawings and supervision of construction. Evaluation of impacts of water control and diversion facilities on fish passage. Preparation of water conservation plans and groundwater management plans for compliance with state and federal regulations.

Flood Control: Party chief for surveys of Delta Islands, including the identification of all facilities and inspection of physical characteristics affecting the integrity of the levee system. Preparation of reports for submittal to FEMA. Gather, establish and document data during and after flood events for the purpose of determining flows, water surface

elevations and the extent of the associated flooding. Evaluation of methods and costs associated with flood events.

Prior to 1988 MBK Engineers, Sacramento, California
Engineering Aide
Conducted (intermittent) field and hydrographic surveys and related office work.

CONTINUING EDUCATION, SEMINARS and WORKSHOPS

- , Water Systems Management Workshop, 1989, U.S. Bureau of Reclamation
- , Flood Fight Methods, 1989, California Department of Water Resources
- , Irrigation System Evaluation Short Course, 1993, California Department of Water Resources and Cal Poly, San Luis Obispo
- , Flow Measurement Control and Monitoring Workshop, 1993, U.S. Bureau of Reclamation, California Department of Water Resources and Cal Poly, San Luis Obispo
- , Flow Measurement, Control and Monitoring Workshop, 1995, U.S. Bureau of Reclamation, California Department of Water Resources and Cal Poly, San Luis Obispo
- , Water Conservation Coordinator Workshop, 1998, U.S. Bureau of Reclamation, California Department of Water Resources and Cal Poly, San Luis Obispo

EDUCATION

- , California State University Sacramento
- , BS in Civil Engineering, 1996

PROFESSIONAL LICENSES AND SOCIETIES

- , Registered Civil Engineer in California
- , Registered Civil Engineer in Oregon
- , Member, American Society of Civil Engineers

EXPERIENCE

- 1996 - Present MBK Engineers, Sacramento, CA
Civil Engineer
Specialize in water rights and water supply analysis. Calculate water use, needs and conservation for large and small irrigation projects. Suggest and oversee modification to irrigation systems. Complete and submit various applications to obtain water rights and changes of water rights with the State Water Resources Control Board. Perform extensive research of water rights, corresponding boundaries and historical quantities from records at Division of Water Rights and Bureau of Land Management. Perform water measurements on streams and canals to determine flows, losses and develop rating curves. Analyze water systems to determine capacities and quantities from various supplies. Obtain permits from US Army Corps and Reclamation Board for installation of pumping plants and measuring facilities along waterways and through levees. Assist in the development and submittal of claims filed in the Klamath River adjudication which required the determination of water needs for over 175,000 acres of irrigated lands. Determine reservoir size, capacities and layout of small reservoirs. Advise clients of potential water supply impacts from regulations imposed by state and federal agencies. Run level surveys of levees to determine land subsidence and water elevations during flood events. Develop groundwater contours and reports of groundwater conditions. Prepare water management plans for irrigation districts. Advise clients on water quality issues.
- 1995 - 1996 Sacramento Regional Wastewater Treatment Plant, Sacramento, CA
Engineering Student Trainee, Level II
Assisted senior engineer with the development and feasibility of producing a biosolids usage program. Performed public educational presentations, and aided in the development of a five-acre land demonstration on the use and application of biosolids on agricultural crops. Monitored soils for heavy metals to ensure compliance of EPA 503 regulations. Assisted two associate engineers in development of heat drying and composting to produce a biosolids fertilizer product.

CONTINUING EDUCATION SEMINARS and WORKSHOPS

- , Irrigation Drainage, Efficiency, Evaluation, Water Conservation and Water Balances, California Polytechnic University, 1997, 1998.
- , Water Management, US Bureau of Reclamation, Denver, CO, 1998.
- , Flood Fight Methods, California Department of Water Resources, Sacramento, CA, 1998.

Maxwell Irrigation District's Water Use Efficiency Grant Application

E-1 - E-2 Proposed Itemized Budget and Budget Justification

Item	Amount	Units	Qty	Total Cost	Units	Life (years)	Present Value	Local Share(\$)	CALFED Request(\$)
a. Salaries and Wages									
Administration (Includes costs for district personnel to administer and monitor the grant application and conjunctive use program development.)	20,000	\$/yr	1	20,000	\$/yr	30	20,000		20,000
Administration (Includes costs for district personnel to administer and monitor the conjunctive use program.)	5,000	\$/yr	15	75,000	\$/yr	30	75,000	75,000	0
b. Fringe Benefits	None – no indirect cost associated with this project								
c. Supplies									
Power supply (Estimated cost to PG&E for transformer and drop line from existing transmission lines.)	6,000	\$	3	18,000	\$	30	18,000	0	18,000
Conveyance Cost (Includes cost for up to 250ft. of 16" pipe, valves, energy dissipaters and miscellaneous welding and labor costs required to convey the ground water to the existing main canals.)	4,000	\$	3	12,000	\$	30	12,000	0	12,000

Maxwell Irrigation District's Water Use Efficiency Grant Application

E-1 - E-2 Proposed Itemized Budget and Budget Justification

Item	Amount	Units	Qty	Total Cost	Units	Life (years)	Present Value	Local Share(\$)	CALFED Request(\$)
d. Equipment	Pumps and related equipment included in Item g.								
e. Services or consultants	Pumps and related equipment included in Item g.								
f. Travel									
None									
g. other direct costs including planning, design, construction, maintenance, etc									
Well drilling and construction (Includes test drilling at the two Tuttle sites, well completion, test pumping, pumping equipment, and contingencies for development of wells)	100,000	\$	3	300,000	\$	30	300,000	0	300,000
Site Acquisition-Gunnersfield (Estimated at \$50,000per site for up to two sites this cost would be reduced by 50% if one of the Gunnersfield sites is utilized)	50,000	\$	2	100,000	\$	30	100,000	0	100,000
Site Acquisition-Tuttle (Cost already incurred by District for easements for up to two well sites	20,000	\$	2	20,000	\$	30	20,000	20,000	0
Site improvements (Includes cost for grading, well pads and retaining walls for three sites.)	50,000	\$	1	50,000	\$	30	50,000	0	50,000
Engineering (Includes costs for preparing grant application, reviewing and evaluating well	20,000	\$	1	20,000	\$	30	20,000	0	20,000

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